WI-PI

A WLAN USB module based on IEEE802.11n standards and offers transfer rate up to 150Mbps

User Guide

Version updates records:

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1.0	2012.7.17	Initial version

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Chapter 1 Overview

1.1 Product Features

The Wi-Pi module is a high performance and cost effective WLAN USB module which enables the Raspberry Pi to connect to a Wi-Fi network. The Wi-Pi module supports 802.11n Wireless Technology standards with data rate upto 150Mbps, as compared to older 54Mbps in 802.11g standards. It also has a higher wireless LAN bandwidth, making data transmission more efficient, whilst also supporting wireless roaming, and ensuring consistent wireless connection. The Wi-Pi uses the latest international wireless CCA air channel detection technology, enhancing wireless performance.

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1.2 Specifications

Hardware Features	
Connector	**USB2.0**
Antenna	Built - in smart antenna
Use of the environment	Work Temperature: 0℃~40℃
	Storage Temperature: -40℃~70℃
Wireless Features	
Standards	IEEE 802.11n; backward compatible with IEEE 802.11g and IEEE 802.11b
Transmission speed	11b: 1/2/5.5/11Mbps
	11g: 6/9/12/18/24/36/48/54Mbps
	11n: up to 150Mbps
Frequency range	2.4 ~ 2.4835GHz
Working channel	1 ~ 13
Transmit power	20dBm(max)
Software function	
Security features	WPA-PSK/WPA2-PSK
	WPA/WPA2
	64/128/152 bit WEP encryption
Operating Systems	Debian 6.0 Linux distribution

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Chapter 2 Steps for using Wi-Pi

2.1 Software Environment

a) Before using the Wi-Pi, the "**Debian6.0 - squeeze"** operating system for Raspberry Pi need to be installed, please refer to the below URLs for help:

http://www.raspberrypi.org/downloads

http://elinux.org/RPi_Easy_SD_Card_Setup

b) Please download the latest Wi-Pi Firmware "**Wi_Pi.Driver.Zip"** from the below URL:

http://www.element14.com/community/docs/DOC-48541

c) Now decompress the downloaded Wi PI firmware "**Wi_Pi.Driver.Zip"** on the Windows PC and copy the **"rt2870.bin"** file to the Raspberry Pi SD card (pre-installed with "Debian6.0 - squeeze" operating system) with the help of card reader.

Currently WI-PI can only be used with the Debian 6.0 operating system

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2.2 Hardware Environment

Before using the Wi-Pi module, setup the Raspberry Pi as shown in the figure below:

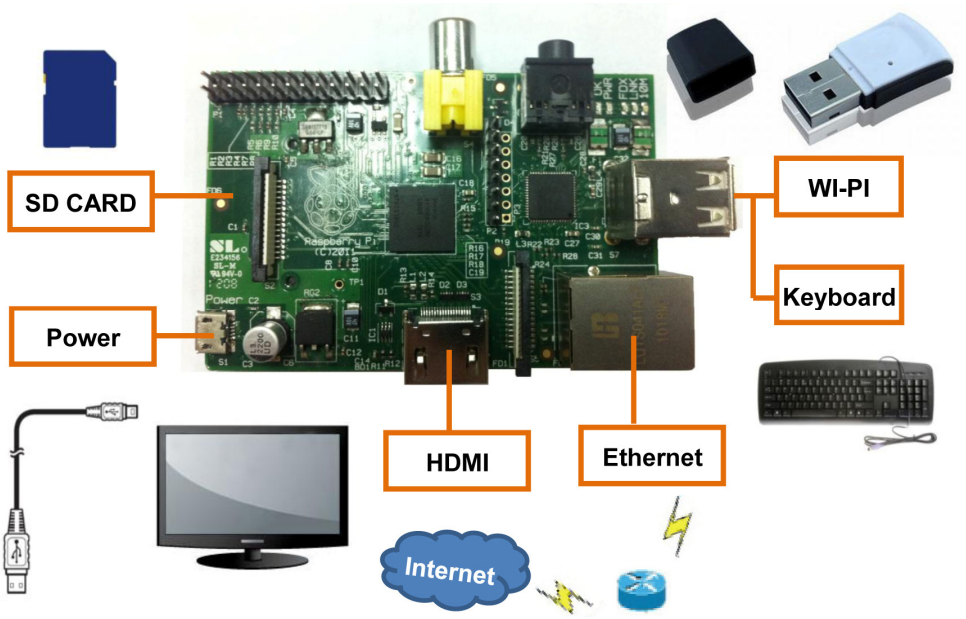

Figure 1

USB host devices are limited to maximal 500mA current output to the USB interface. So if too many USB accessories are connected to the Raspberry Pi simultaneously, WI-PI module may fail to function due to this USB host current limitation. To overcome such current limitations please remove all the unused USB accessories from the Raspberry Pi, or power the Raspberry Pi using high power USB power adapter.

2.3 Wireless Installation

Power up the board, and use a crossover cable to connect to the network through a local modem/router, and follow the below steps to install the drivers for Wi-Pi module:

1) Modify sources.list

```
pi@raspberrypi:~$ sudo su
root@raspberrypi:~# vim.tiny /etc/apt/sources.list
```

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Modify the file like this:

```
deb http://ftp.uk.debian.org/debian/ squeeze main
deb http://ftp.uk.debian.org/debian/ squeeze main non-free
deb http://ftp.us.debian.org/debian squeeze main contrib non-free

# Nokia Qt5 development
deb http://archive.qmh-project.org/rpi/debian/ unstable main
```

Adding the "**deb http://ftp.us.debian.org/debian squeeze main contrib non-free**" for installing the Wi-Pi driver.

2) Install wireless

```
root @raspberrypi:~# aptitude update
Ign http://archive.qmh-project.org unstable Release.gpg
Ign http://archive.qmh-project.org/rpi/debian/ unstable/main Translation-en
Ign http://archive.qmh-project.org/rpi/debian/ unstable/main Translation-en_GB
Hit http://ftp.us.debian.org squeeze Release.gpg
Ign http://ftp.us.debian.org/debian/ squeeze/contrib Translation-en
Ign http://ftp.us.debian.org/debian/ squeeze/contrib Translation-en_GB
Ign http://ftp.us.debian.org/debian/ squeeze/main Translation-en
Ign http://ftp.us.debian.org/debian/ squeeze/main Translation-en_GB
Ign http://ftp.us.debian.org/debian/ squeeze/non-free Translation-en
Ign http://ftp.us.debian.org/debian/ squeeze/non-free Translation-en_GB
Get:1 http://ftp.uk.debian.org squeeze Release.gpg [1,672 B]
Ign http://ftp.uk.debian.org/debian/ squeeze/main Translation-en
Ign http://ftp.uk.debian.org/debian/ squeeze/main Translation-en_GB
Ign http://ftp.uk.debian.org/debian/ squeeze/non-free Translation-en
Ign http://archive.qmh-project.org unstable Release
Hit http://ftp.us.debian.org squeeze Release
Ign http://ftp.uk.debian.org/debian/ squeeze/non-free Translation-en_GB
```

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Get:2 http://ftp.uk.debian.org squeeze Release [111 kB]

Ign http://archive.qmh-project.org unstable/main armel Packages/DiffIndex

Ign http://archive.qmh-project.org unstable/main armel Packages

Hit http://ftp.us.debian.org squeeze/main armel Packages

Hit http://archive.qmh-project.org unstable/main armel Packages

Hit http://ftp.us.debian.org squeeze/contrib armel Packages

Hit http://ftp.us.debian.org squeeze/non-free armel Packages

Get:3 http://ftp.uk.debian.org squeeze/main armel Packages [6,424 kB]

Get:4 http://ftp.uk.debian.org squeeze/non-free armel Packages [83.1 kB]

Fetched 6,620 kB in 1min 41s (65.3 kB/s)

W: Duplicate sources.list entry http://ftp.uk.debian.org/debian/ squeeze/main armel Packages (/var/lib/apt/lists/ftp.uk.debian.org_debian_dists_squeeze_main_binary-armel_Packages)

W: You may want to run apt-get update to correct these problems

root @raspberrypi:~# **aptitude install firmware-ralink**

The following NEW packages will be installed:

  firmware-ralink

0 packages upgraded, 1 newly installed, 0 to remove and 42 not upgraded.

Need to get 21.5 kB of archives. After unpacking 111 kB will be used.

Get:1 http://ftp.uk.debian.org/debian/ squeeze/non-free firmware-ralink all 0.28+squeeze1 [21.5 kB]

Fetched 21.5 kB in 3s (6,636 B/s)

Selecting previously deselected package firmware-ralink.

(Reading database ... 46441 files and directories currently installed.)

Unpacking firmware-ralink (from .../firmware-ralink_0.28+squeeze1_all.deb) ...

Setting up firmware-ralink (0.28+squeeze1) ...

root @raspberrypi:~# **aptitude install wireless-tools**

No packages will be installed, upgraded, or removed.

0 packages upgraded, 0 newly installed, 0 to remove and 42 not upgraded.

Need to get 0 B of archives. After unpacking 0 B will be used.

root @raspberrypi:~# **cp /boot/rt2870.bin /lib/firmware/rt2870.bin**

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The firmware "**rt2870.bin**" provided with Debian operating system is out of date and need to be updated with the provided newer version of firmware [section-2.1(b)], use the above command "**cp /boot/rt2870.bin /lib/firmware/rt2870.bin**" to update the firmware.

2.4 Wireless Setup

First Remove the crossover cable, and then, connect to a wireless network using below steps:

```
root @raspberrypi:~# vim.tiny /etc/network/interfaces
```

The WI-PI module supports variety of encryption modes; modify the file as per your wireless router encryption settings.

1) WPA/WPA2

【DHCP】

```
auto wlan0
iface wlan0 inet dhcp
    wpa-ssid mynetworkname
    wpa-psk mysecretpassphrase
```

2) WEP(ASCII string key)

【DHCP】

```
auto wlan0
iface wlan0 inet dhcp
    wireless-essid mynetworkname
    wireless-key s: mysecretpassphrase
```

3) WEP(binary key)

【DHCP】

```
auto wlan0
iface wlan0 inet dhcp
    wireless-essid mynetworkname
    wireless-key mysecretpassphrase
```

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mynetworkname is the name of the wireless router,

mysecretpassphrase is the password for it.

2.5 Connect to the Internet

```
root @raspberrypi:~# /etc/init.d/networking restart
Running /etc/init.d/networking restart is deprecated because it may not enable again some
interfaces ... (warning).
Reconfiguring network interfaces...Internet Systems Consortium DHCP Client 4.1.1-P1
Copyright 2004-2010 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LPF/wlan0/00:0f:12:48:0b:9c
Sending on      LPF/wlan0/00:0f:12:48:0b:9c
Sending on      Socket/fallback
DHCPDISCOVER on wlan0 to 255.255.255.255 port 67 interval 7
DHCPDISCOVER on wlan0 to 255.255.255.255 port 67 interval 14
DHCPOFFER from 192.168.1.254
DHCPREQUEST on wlan0 to 255.255.255.255 port 67
DHCPACK from 192.168.1.254
bound to 192.168.1.101 -- renewal in 3509 seconds.
done.
root @raspberrypi:~# iwconfig
lo              no wireless extensions.

eth0          no wireless extensions.

wlan0         IEEE 802.11bgn    ESSID:"Pi"
```

```
Mode:Managed  Frequency:2.412 GHz  Access Point: 94:0C:6D:17:0A:BC
Bit Rate=5.5 Mb/s   Tx-Power=20 dBm
Retry  long limit:7   RTS thr:off   Fragment thr:off
Encryption key:off
Power Management:on
Link Quality=57/70  Signal level=-53 dBm
Rx invalid nwid:0  Rx invalid crypt:0  Rx invalid frag:0
Tx excessive retries:0  Invalid misc:25   Missed beacon:0
```

It takes some time for the WI-PI to connect the internet, when the Wi-Pi module LED starts to flicker, try to ping the internet.

```
root @raspberrypi:~# ping www.google.com
Pinging www. l.google.com[74.125.71.99] with 32 bytes of data:
Reply from 74.125.71.99: bytes=32 time=152ms TTL=52
Reply from 74.125.71.99: bytes=32 time=120ms TTL=52
Reply from 74.125.71.99: bytes=32 time=106ms TTL=52
```

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Customer Service & Technical support

Customer Service

Please contact Premier Farnell local sales and customer services staffs for the help.

Website: http://www.farnell.com/

Technical Support

Please contact Premier Farnell local technical support team for any technical issues through the telephone, live chat & email, or post your questions on the below micro site, we will reply to you as soon as possible.

Centralized technical support mail box: knode_tech@element14.com

Community: http://www.element14.com/community/groups/raspberry-pi

Notes

This board was designed by element14's design partner- Embest, you can contact them to get the technical support as well.

Technical Support:

E-mail: support@embedinfo.com

URL: http://www.armkits.com